

Half-Life

Chapter 7.2

Half-Life of Radioactive Substances

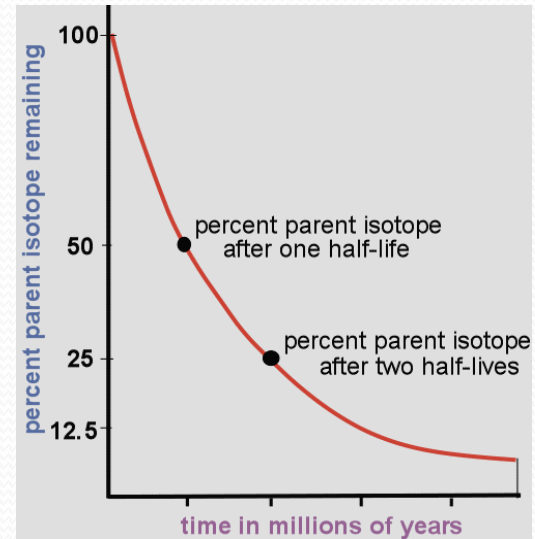
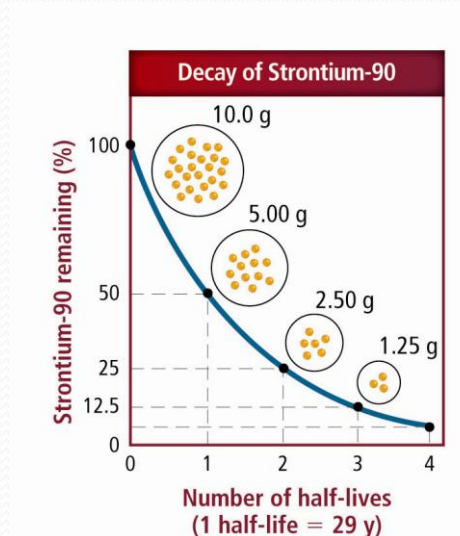
- Every **radioactive** substance undergoes **decay**, but all at different rates
- The **rate** at which an isotope decays is described as its **half life**
- HALF LIFE- the **time** for **50%** of the nuclei in a sample of the radioisotope to decay

See data booklet

Parent	Daughter	Half-life of parent (years)
Carbon-14	Nitrogen-14	5730
Uranium-235	Lead-207	710 million
Potassium-40	Argon-40	1.3 billion
Uranium-238	Lead-206	4.5 billion
Thorium-235	Lead-208	14 billion
Rubidium-87	Strontium-87	47 billion

Decay Curve

- graph of the **percent of remaining** radioisotope over time



Decay Curve

Sample questions

- 1. How many of a 100.0 g sample of ^{198}Au is left after 8.10 days if its half-life is 2.70 days?

- 2. A 50.0 g sample of ^{16}N decays to 12.5g in 14.4 seconds. What is its half-life?

- 3. The half-life of ^{42}K is 12.4 hours. How much of a 750 g sample is left after 62.0 hours?

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42. A fossil is removed from a bedrock layer and is found to contain $\frac{1}{4}$ of the original amount of carbon-14. What conclusion can be made about the age of the fossil?
- A. It is 1 433 years old.
 - B. It is 5 730 years old.
 - C. It is 11 460 years old.
 - D. It is 22 920 years old.